# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

## Before the Board of Patent Appeals and Interferences

**In re the Application of**

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| **Inventor** | **:** | **Rohit Garg et al.** |
| **Application No.** | **:** | **10/578,632** |
| **Filed** | **:** | **May 9, 2006** |
| **For** | **:** | **ULTRASONIC IMAGING SYSTEM AND METHOD FOR SIMULTANEOUS DISPLAY OF BLOOD FLOW AND PERFUSION PARAMETERS** |

## REPLY BRIEF

**On Appeal from Group Art Unit 3737**
**Examiner Rochelle D. Reardon**

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# ARGUMENT

## Applicants' Response to (10) Examiner's Response to Applicant's Argument

In response to the Examiner's Answer mailed September 16, 2010, applicants offer the following observations.

At the outset of the "Response to Argument" on page 7 of the Examiner's Answer the Examiner states that "Schwartz discloses producing three-dimensional images which inherently include two-dimensional images (col. 2, ll. 10-12)." This is not correct. First, the cited passage, lines 10-12 of column 2 of US Pat. 5,720,291 (Schwartz), refers only to three dimensional ultrasonic presentations. Second, the ultrasound system of Fig. 2 of Schwartz only produces rendered three dimensional images; no two dimensional images are formed. Three dimensional image rendering uses a ray-casting technique described in Fig. 4 of Schwartz to produce a three dimensional image from a particular viewing perspective. As is well known, a rendered image is purely a projected 3D image; it cannot be de-constructed or otherwise reduced to two dimensional images. While Schwartz may acquire his 3D datasets by scanning sequential planes of a volume, the operationally simpler way to acquire 3D data than random scanline acquisition, this is only a data acquisition technique and is invisible to the user. The acquired 3D

datasets, however they may be acquired, are processed as 3D data and only used to render a 3D image. No two dimensional imaging is done by Schwartz, nor is two dimensional imaging in any way inherent in a rendered three dimensional image.

But the important point to realize about Schwartz's system is that he is making tissue on the outside of a volume translucent so that the viewer can see the vasculature inside the volume of tissue. This is obviously beneficial in volumetric imaging, for if the tissue remains opaque, all the viewer will see in the rendered image is the outside of an opaque block of tissue. Diagnosis of the blood vessels deeper inside the volume which are obscured by the outer wall of tissue will be impossible.

In the present invention, the perfusion image is not at a deeper depth, obscured by nearer tissue. As the claims state, the parametric perfusion image corresponds to the same region as the structural (tissue) image. In the examples shown in Figs. 15a-15e, the perfusion is of the same plane of tissue as the structural (tissue) image. Since one is not behind the other as in the 3D case of Schwartz, it would not be obvious to one skilled in the art to change the opacity; the two images are co-planar. The present invention provides an advantage not found in the prior art. It enables the clinician to make a diagnosis by fading back and forth between the tissue image and the tissue's perfusion by varying a range of

relative opacities while maintaining the anatomical registration of the two types of information. The clinician is then able to pinpoint exact locations in the tissue where perfusion may be inadequate. It is respectfully requested that the Board bear in mind these differences of the present invention and the prior art when assessing applicants' claims.

## CONCLUSION

Based on the law and the facts, it is respectfully submitted that Claims 1-19 are patentable over the Schwartz patent and the other cited references. Accordingly, it is respectfully requested that this Honorable Board reverse the grounds of rejection of these claims stated in the January 26, 2010 Office action being appealed.

Respectfully submitted,

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